# FT 7.62-A-2

## FIRING TABLES

## Gun, Machine, 7.62MM, M60

## on

## Mount, Machine Gun, 7.62MM, M122

## and

## Rifle, 7.62MM, M14

HEADQUARTERS, DEPARTMENT OF THE ARMY

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# Firing Tables
for
Gun, Machine, 7.62mm, M60
on
Mount, Machine Gun, 7.62mm, M122
and
Rifle, 7.62mm, M14
Firing
Cartridge, Ball, NATO, M59
Cartridge, Ball, NATO, M80
Cartridge, AP, NATO, M61
Cartridge, Tracer, NATO, M62

CONTENTS

| | Page |
|---|---|
| List of Symbols and Abbreviations | 2 |
| Conversion Factors | 2 |
| Introduction | 3 |
| Explanation of Use of Tables | 4 |
| Part 1 | 7 |
| Part 2 | 15 |

## List of Symbols and Abbreviations

| | |
|---|---|
| AE | angle of elevation |
| m/s | meters per second |
| m | meters |
| mm | millimeter |
| % | percent |
| sec | second |
| mils | mils |

## Conversion Factors

| | |
|---|---|
| 1 yard = 0.9144 meter | 1 minute = 0.2963 mil |
| 1 meter = 1.0936 yards | 1 mil = 0.05625 degree |
| 1 degree = 17.7778 mils | 1 mil = 3.375 minutes |

## INTRODUCTION

The data presented in Part 1 of these tables are based, in part, on vertical target firings of Cartridge, Ball, M59 and Cartridge, AP, M61 conducted at Aberdeen Proving Ground, Maryland during 1953 and recorded in APG Firing Record No. S-46076 and 28th Report on Project TS1-2. Range firings to determine maximum range were conducted in June 1954.

The data presented in Part 1 are applicable to Cartridge, Tracer, M62 only to burn out (approximately 900 meters range), beyond which the range of Cartridge, Tracer, M62 will be less than that of Cartridge, Ball, M59 or Cartridge, AP, M61.

The data presented in Part 2 of these tables are based, in part, on vertical target and range firings of Cartridge, Ball, M80 conducted at Aberdeen Proving Ground, Maryland during 1960 and 1961 and recorded in APG Firing Record No. S-46378.

The dispersion data presented in these tables are based on firings conducted during 1960 and 1961, recorded in APG Firing Record No. S-46379 and on firings conducted in August 1957, recorded in APG Firing Record No. S-46272. The firings in 1960 and 1961 were conducted with the Machine Gun, M60 on Mount, Tripod, Machine Gun, M122 resting on a hard surface with the legs of the mount sand bagged and the gun grasped lightly at the trigger housing by the gunner. Any modification in the machine gun, tripod or the conditions of fire may produce a maximum cone of dispersion and a mean effective beaten zone considerably different from those given in these tables.

The standard velocity of all the cartridges fired from the Machine Gun, M60 is 838.2 m/s at 23.8 meters from the muzzle for a new gun. These tables are computed for a muzzle velocity of 839.7 m/s which accounts for some of the loss in muzzle velocity due to erosion.

All of the data given in these tables, except dispersion information, are applicable to Rifle, 7.62mm, M14.

## Explanation of Use of Tables

Table A: Angles of Elevation, Dimensions of Cone and Beaten Zone, Angles of Fall and Times of Flight.

Interpolation is necessary to obtain values for ranges not in exact hundreds of meters. Example: Required to find the angle of elevation for 1630 meters. Refer to Page 8. The angle of elevation for 1600 meters is 45.9 mils; for 1700 meters, 52.6 mils. The difference is 6.7 mils and is shown in the column headed "Difference". The angle of elevation for 30 meters at this range is three-tenths of 6.7 or 2.0 mils. Then the required angle of elevation for 1630 meters is 45.9 plus 2.0 or 47.9 mils. The procedure is the same for other values in the table.

Table B: Overhead Fire.

This table gives information that is needed when firing over the heads of friendly troops. The following definitions are pertinent:

Angle of Elevation: The angle between the axis of the gun barrel and the horizontal. The angle of elevation for a given range is presented in Table A.

Angle of Site: The angle between the gun to target line and the horizontal. If the target and gun are at the same altitude, the angle of site is zero.

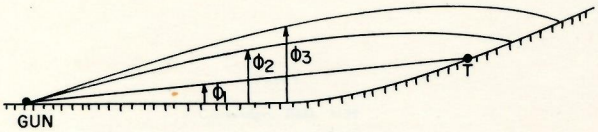
Minimum Angle of Elevation: The angle of elevation for a given range plus a safety angle which varies with range.

(1) Determine the range to friendly troops.

(2) Locate this range in column 1.

(3) Extract minimum angle of elevation from column 2.

(4) Add the angle of site to obtain the lowest angle that is safe to fire over friendly troops.




T: location of friendly troops

$\phi_1$: angle of site to friendly troops

$\phi_2$: minimum angle of elevation (Table B, Column 2)

$\phi_3 = \phi_1 + \phi_2$: angle that is safe to fire over friendly troops

Numerical Example:

Assume the following conditions:

| | |
|---|---|
| Range to friendly troops | 800 m |
| Angle of site to friendly troops | 4 mil |
| Minimum Angle of Elevation (Page 9, Column 2) for a range of 800 meters | 27.9 mil |
| Angle of Site to friendly troops | + 4.0 mil |
| Lowest angle at which it is safe to fire | 31.9 mil |

The range corresponding to 31.9 mil in Table A, Page 8 is 1360 meters. Thus, it would be safe to attack targets at ranges of 1360 meters or greater when friendly troops are located as specified in this example.

Table C: Ordinates in Meters

The black figures indicate the height in meters of the center of the cone above the line of site at any distance from the gun. The red figures indicate the distance of the center of the cone below the line of site at any distance from the gun.

EXAMPLE: Referring to Page 11, at a range of 1900 meters (column of figures at right) and at a distance of 1100 meters from the gun (line of figures under distance from the gun) the center of the cone is 50 meters above the line of site. At a distance of 2100 meters from the gun, the center of the cone is 34 meters below the line of site.

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Part 1

Cartridge, Ball, M59
Cartridge, AP, M61
Cartridge, Tracer, M62

Muzzle Velocity - 839.7 m/s
Drag Function - $G_{7.1}$

| Elevation, $\phi$, in mils | Ballistic Coefficient |
|---|---|
| $0 \leq \phi \leq 16$ | $(0.21) - (0.5 \times 10^{-3})\,\phi + (0.16073807 \times 10^{-4})\,\phi^2 - (0.10717032 \times 10^{-5})\,\phi^3 + (0.28607204 \times 10^{-7})\,\phi^4$ |
| $16 \leq \phi \leq 26$ | $(0.2033131) + (0.80461484 \times 10^{-3})\,\phi - (0.83225068 \times 10^{-4})\,\phi^2 + (0.25823805 \times 10^{-5})\,\phi^3 - (0.28362224 \times 10^{-7})\,\phi^4$ |
| $26 \leq \phi \leq 200$ | $(0.20916739) - (0.40056365 \times 10^{-3})\,\phi + (0.26830384 \times 10^{-5})\,\phi^2 - (0.98487175 \times 10^{-8})\,\phi^3 + (0.14508463 \times 10^{-10})\,\phi^4$ |
| $200 \leq \phi \leq 800$ | $(0.1965484) - (0.12124156 \times 10^{-3})\,\phi + (0.25970268 \times 10^{-6})\,\phi^2 - (0.25502193 \times 10^{-9})\,\phi^3 + (0.94986219 \times 10^{-13})\,\phi^4$ |

| Range | Angle of Elevation | Difference | Vertical 100% Cone | | Effective 82% Beaten Zone Width | | Lgth | Angle of Fall | Time of Flight |
|---|---|---|---|---|---|---|---|---|---|
| m | mil | mil | mil | m | mil | m | m | mil | sec |
| 100 | 0.7 | | 2.7 | 0.3 | | | | 1 | 0.13 |
| | | 0.9 | | | | | | | |
| 200 | 1.6 | | 2.4 | 0.5 | | | | 2 | 0.27 |
| | | 1.0 | | | | | | | |
| 300 | 2.6 | | 2.1 | 0.6 | | | | 3 | 0.42 |
| | | 1.1 | | | | | | | |
| 400 | 3.7 | | 2.4 | 0.9 | | | | 5 | 0.58 |
| | | 1.3 | | | | | | | |
| 500 | 5.0 | | 2.4 | 1.2 | 2 | 1 | 86 | 7 | 0.76 |
| | | 1.5 | | | | | | | |
| 600 | 6.5 | | 2.5 | 1.5 | | | | 10 | 0.97 |
| | | 1.8 | | | | | | | |
| 700 | 8.3 | | 2.7 | 1.8 | | | | 14 | 1.21 |
| | | 2.2 | | | | | | | |
| 800 | 10.5 | | 2.8 | 2.2 | | | | 19 | 1.48 |
| | | 2.6 | | | | | | | |
| 900 | 13.1 | | 3.1 | 2.7 | | | | 26 | 1.78 |
| | | 3.1 | | | | | | | |
| 1000 | 16.2 | | 3.3 | 3.2 | 2 | 2 | 50 | 33 | 2.11 |
| | | 3.7 | | | | | | | |
| 1100 | 19.9 | | 3.6 | 3.9 | | | | 42 | 2.46 |
| | | 4.2 | | | | | | | |
| 1200 | 24.1 | | 3.8 | 4.5 | | | | 51 | 2.83 |
| | | 4.7 | | | | | | | |
| 1300 | 28.8 | | 4.1 | 5.2 | | | | 61 | 3.22 |
| | | 5.2 | | | | | | | |
| 1400 | 34.0 | | 4.4 | 6.0 | | | | 72 | 3.63 |
| | | 5.7 | | | | | | | |
| 1500 | 39.7 | | 4.7 | 6.9 | 2 | 3 | 42 | 84 | 4.06 |
| | | 6.2 | | | | | | | |
| 1600 | 45.9 | | 5.1 | 7.9 | | | | 97 | 4.51 |
| | | 6.7 | | | | | | | |
| 1700 | 52.6 | | 5.4 | 9.1 | | | | 111 | 4.98 |
| | | 7.3 | | | | | | | |
| 1800 | 59.9 | | 5.9 | 10.5 | | | | 128 | 5.47 |
| | | 7.9 | | | | | | | |
| 1900 | 67.8 | | 6.4 | 12.0 | | | | 146 | 5.99 |
| | | 8.6 | | | | | | | |
| 2000 | 76.4 | | 7.0 | 13.8 | 2 | 4 | 42 | 166 | 6.54 |
| | | 9.4 | | | | | | | |
| 2100 | 85.8 | | 7.6 | 15.7 | | | | 188 | 7.12 |
| | | 10.3 | | | | | | | |
| 2200 | 96.1 | | 8.4 | 18.0 | | | | 213 | 7.73 |
| | | 11.2 | | | | | | | |
| 2300 | 107.3 | | 9.0 | 20.4 | | | | 240 | 8.38 |
| | | 12.1 | | | | | | | |
| 2400 | 119.4 | | 10.0 | 23.4 | | | | 271 | 9.06 |
| | | 13.1 | | | | | | | |
| 2500 | 132.5 | | 10.8 | 26.5 | 3 | 6 | 43 | 304 | 9.78 |
| | | 14.3 | | | | | | | |
| 2600 | 146.8 | | 11.9 | 30.3 | | | | 341 | 10.54 |
| | | 15.7 | | | | | | | |
| 2700 | 162.5 | | 13.0 | 34.5 | | | | 381 | 11.35 |
| | | 17.4 | | | | | | | |
| 2800 | 179.9 | | 14.4 | 39.4 | | | | 425 | 12.22 |
| | | 19.3 | | | | | | | |
| 2900 | 199.2 | | 15.9 | 45.3 | | | | 475 | 13.15 |
| | | 21.4 | | | | | | | |
| 3000 | 220.6 | | 17.6 | 51.8 | 3 | 9 | 46 | 527 | 14.15 |
| | | 23.8 | | | | | | | |
| 3100 | 244.4 | | 19.8 | 60.2 | | | | 585 | 15.23 |
| | | 26.7 | | | | | | | |
| 3200 | 271.1 | | 22.1 | 69.4 | | | | 648 | 16.41 |
| | | 30.6 | | | | | | | |
| 3300 | 301.7 | | 25.1 | 81.3 | | | | 716 | 17.72 |
| | | 36.0 | | | | | | | |
| 3400 | 337.7 | | 28.5 | 95.1 | | | | 790 | 19.20 |
| | | 43.5 | | | | | | | |
| 3500 | 381.2 | | 33.1 | 113.9 | 3 | 12 | 50 | 871 | 20.91 |
| | | 56.2 | | | | | | | |
| 3600 | 437.4 | | 39.1 | 138.2 | | | | 962 | 23.04 |
| | | 95.3 | | | | | | | |
| 3700 | 532.7 | | | | | | | 1088 | 26.42 |
| 3725 | 608.5 | | | | | | | 1167 | 28.96 |

Overhead Fire

| 1 | 2 | | 3 | |
|---|---|---|---|---|
| Troop Distance | Minimum Angle of Elevation | Difference | Corresponding Range | |
| | | | Exact Figure | Even Figure (to nearest 25 above) |
| meters | mils | mils | meters | meters |
| 100 | 77.0 | | 2006 | 2025 |
| | | -36.4 | | |
| 200 | 40.6 | | 1515 | 1525 |
| | | -11.1 | | |
| 300 | 29.5 | | 1314 | 1325 |
| | | -4.4 | | |
| 400 | 25.1 | | 1222 | 1225 |
| | | -1.8 | | |
| 500 | 23.3 | | 1182 | 1200 |
| | | -0.1 | | |
| 600 | 23.2 | | 1178 | 1200 |
| | | 1.8 | | |
| 700 | 25.0 | | 1220 | 1225 |
| | | 2.9 | | |
| 800 | 27.9 | | 1280 | 1300 |
| | | 3.6 | | |
| 900 | 31.5 | | 1351 | 1375 |
| | | 4.3 | | |
| 1000 | 35.8 | | 1432 | 1450 |
| | | 5.4 | | |
| 1100 | 41.2 | | 1524 | 1525 |
| | | 5.9 | | |
| 1200 | 47.1 | | 1618 | 1625 |
| | | 6.8 | | |
| 1300 | 53.9 | | 1718 | 1725 |
| | | 7.7 | | |
| 1400 | 61.6 | | 1821 | 1825 |
| | | 8.4 | | |
| 1500 | 70.0 | | 1926 | 1950 |
| | | 9.6 | | |
| 1600 | 79.6 | | 2034 | 2050 |
| | | 10.4 | | |
| 1700 | 90.0 | | 2141 | 2150 |
| | | 11.9 | | |
| 1800 | 101.9 | | 2252 | 2275 |
| | | 12.8 | | |
| 1900 | 114.7 | | 2361 | 2375 |
| | | 14.1 | | |
| 2000 | 128.8 | | 2472 | 2475 |
| | | 15.4 | | |
| 2100 | 144.2 | | 2582 | 2600 |
| | | 17.4 | | |
| 2200 | 161.6 | | 2694 | 2700 |
| | | 19.7 | | |
| 2300 | 181.3 | | 2807 | 2825 |
| | | 22.4 | | |
| 2400 | 203.7 | | 2921 | 2925 |
| | | 24.8 | | |
| 2500 | 228.5 | | 3033 | 3050 |
| | | 28.4 | | |
| 2600 | 256.9 | | 3147 | 3150 |
| | | 32.3 | | |
| 2700 | 289.2 | | 3259 | 3275 |
| | | 38.8 | | |
| 2800 | 328.0 | | 3373 | 3375 |
| | | 47.5 | | |
| 2900 | 375.5 | | 3487 | 3500 |
| | | 62.9 | | |
| 3000 | 438.4 | | 3601 | 3625 |

Ordinates in Meters

| Range | Horizontal Distance from the Gun – meters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| meters | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| 0 | 0 | 0 | 0 | 1 | 2 | 4 | 6 | 9 |
| 100 | 0 | 0 | 0 | 1 | 2 | 3 | 5 | 8 |
| 200 | 0 | 0 | 0 | 1 | 2 | 3 | 5 | 7 |
| 300 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 6 |
| 400 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 5 |
| 500 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 4 |
| 600 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 3 |
| 700 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 2 |
| 800 | 1 | 2 | 3 | 3 | 3 | 2 | 1 | 0 |
| 900 | 2 | 3 | 4 | 4 | 4 | 4 | 3 | 2 |
| 1000 | 2 | 4 | 5 | 6 | 6 | 6 | 5 | 4 |
| 1100 | 2 | 4 | 6 | 7 | 8 | 8 | 8 | 7 |
| 1200 | 3 | 5 | 7 | 9 | 10 | 11 | 11 | 10 |
| 1300 | 3 | 6 | 9 | 11 | 13 | 14 | 14 | 14 |
| 1400 | 4 | 7 | 10 | 13 | 15 | 17 | 18 | 18 |
| 1500 | 4 | 8 | 12 | 15 | 18 | 20 | 22 | 23 |
| 1600 | 5 | 10 | 14 | 18 | 21 | 24 | 26 | 28 |
| 1700 | 6 | 11 | 16 | 20 | 24 | 27 | 30 | 33 |
| 1800 | 6 | 12 | 18 | 23 | 27 | 31 | 35 | 38 |
| 1900 | 7 | 14 | 20 | 26 | 31 | 36 | 40 | 44 |
| 2000 | 8 | 16 | 23 | 29 | 35 | 40 | 45 | 50 |
| 2100 | 9 | 18 | 26 | 33 | 39 | 45 | 51 | 57 |
| 2200 | 10 | 20 | 29 | 37 | 44 | 51 | 58 | 65 |
| 2300 | 11 | 22 | 32 | 41 | 50 | 58 | 66 | 74 |
| 2400 | 12 | 24 | 35 | 46 | 56 | 66 | 75 | 84 |
| 2500 | 14 | 27 | 39 | 51 | 63 | 74 | 85 | 95 |
| 2600 | 15 | 30 | 44 | 57 | 70 | 83 | 95 | 106 |
| 2700 | 17 | 33 | 49 | 64 | 78 | 92 | 106 | 119 |
| 2800 | 18 | 36 | 54 | 71 | 87 | 103 | 118 | 133 |
| 2900 | 20 | 40 | 60 | 79 | 97 | 115 | 132 | 149 |
| 3000 | 22 | 44 | 66 | 87 | 108 | 128 | 147 | 166 |
| 3100 | 25 | 49 | 73 | 97 | 120 | 142 | 164 | 185 |
| 3200 | 28 | 55 | 82 | 108 | 134 | 159 | 183 | 207 |
| 3300 | 31 | 62 | 92 | 121 | 150 | 178 | 206 | 233 |
| 3400 | 35 | 70 | 104 | 137 | 169 | 201 | 233 | 264 |
| 3500 | 41 | 80 | 119 | 157 | 194 | 231 | 267 | 302 |
| 3600 | 48 | 94 | 139 | 184 | 228 | 271 | 313 | 354 |
| 3700 | 57 | 115 | 172 | 228 | 284 | 339 | 393 | 446 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Horizontal Distance from the Gun - meters | | | | | | | | Range |
|---|---|---|---|---|---|---|---|---|
| 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | meters |
| 12 | 16 | 21 | 27 | 35 | 44 | 54 | 66 | 0 |
| 11 | 15 | 20 | 26 | 34 | 43 | 53 | 65 | 100 |
| 10 | 14 | 19 | 25 | 33 | 42 | 52 | 64 | 200 |
| 9 | 13 | 18 | 24 | 32 | 41 | 51 | 63 | 300 |
| 8 | 12 | 17 | 23 | 30 | 39 | 49 | 61 | 400 |
| 7 | 11 | 16 | 22 | 29 | 38 | 48 | 60 | 500 |
| 6 | 9 | 14 | 20 | 27 | 36 | 46 | 58 | 600 |
| 4 | 7 | 11 | 17 | 25 | 34 | 44 | 55 | 700 |
| 2 | 5 | 9 | 15 | 22 | 31 | 41 | 52 | 800 |
| 0 | 3 | 7 | 12 | 19 | 27 | 37 | 48 | 900 |
| 2 | 0 | 4 | 9 | 15 | 23 | 32 | 43 | 1000 |
| 5 | 3 | 0 | 5 | 11 | 18 | 27 | 37 | 1100 |
| 9 | 7 | 4 | 0 | 6 | 13 | 21 | 31 | 1200 |
| 13 | 12 | 9 | 5 | 0 | 7 | 15 | 25 | 1300 |
| 18 | 17 | 15 | 11 | 6 | 0 | 8 | 18 | 1400 |
| 24 | 23 | 21 | 18 | 13 | 7 | 0 | 9 | 1500 |
| 29 | 29 | 28 | 25 | 21 | 16 | 9 | 0 | 1600 |
| 35 | 36 | 35 | 33 | 30 | 25 | 18 | 10 | 1700 |
| 41 | 42 | 42 | 41 | 39 | 35 | 29 | 21 | 1800 |
| 47 | 49 | 50 | 50 | 48 | 45 | 40 | 33 | 1900 |
| 54 | 57 | 59 | 60 | 59 | 56 | 52 | 46 | 2000 |
| 62 | 66 | 69 | 71 | 71 | 69 | 65 | 60 | 2100 |
| 71 | 76 | 80 | 83 | 84 | 83 | 80 | 76 | 2200 |
| 81 | 87 | 92 | 96 | 98 | 98 | 96 | 93 | 2300 |
| 92 | 99 | 105 | 110 | 113 | 114 | 113 | 111 | 2400 |
| 104 | 112 | 119 | 125 | 129 | 131 | 132 | 131 | 2500 |
| 117 | 126 | 134 | 141 | 147 | 151 | 153 | 153 | 2600 |
| 131 | 142 | 152 | 160 | 167 | 172 | 176 | 178 | 2700 |
| 147 | 160 | 171 | 181 | 189 | 196 | 201 | 205 | 2800 |
| 165 | 179 | 192 | 204 | 214 | 222 | 229 | 234 | 2900 |
| 184 | 200 | 215 | 229 | 241 | 251 | 260 | 267 | 3000 |
| 205 | 224 | 241 | 257 | 271 | 284 | 295 | 304 | 3100 |
| 230 | 251 | 271 | 289 | 306 | 322 | 336 | 347 | 3200 |
| 259 | 283 | 306 | 327 | 347 | 366 | 383 | 397 | 3300 |
| 293 | 321 | 348 | 373 | 397 | 419 | 439 | 457 | 3400 |
| 336 | 369 | 401 | 431 | 459 | 485 | 509 | 531 | 3500 |
| 394 | 433 | 471 | 507 | 541 | 573 | 602 | 628 | 3600 |
| 497 | 547 | 595 | 641 | 685 | 726 | 764 | 799 | 3700 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Range meters | Horizontal Distance from the Gun - meters | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 |
| 0 | 80 | 96 | 114 | 134 | 157 | 182 | 210 |
| 100 | 79 | 95 | 113 | 133 | 155 | 180 | 208 |
| 200 | 78 | 94 | 112 | 132 | 154 | 179 | 207 |
| 300 | 77 | 93 | 111 | 131 | 153 | 178 | 206 |
| 400 | 75 | 91 | 109 | 129 | 151 | 176 | 204 |
| 500 | 73 | 88 | 106 | 126 | 149 | 174 | 202 |
| 600 | 71 | 86 | 104 | 124 | 146 | 171 | 199 |
| 700 | 68 | 83 | 101 | 121 | 143 | 168 | 196 |
| 800 | 65 | 80 | 97 | 117 | 139 | 164 | 192 |
| 900 | 61 | 76 | 93 | 112 | 134 | 159 | 187 |
| 1000 | 56 | 71 | 88 | 107 | 129 | 153 | 181 |
| 1100 | 50 | 65 | 82 | 101 | 123 | 147 | 174 |
| 1200 | 44 | 58 | 75 | 94 | 115 | 139 | 166 |
| 1300 | 37 | 51 | 67 | 85 | 106 | 130 | 157 |
| 1400 | 29 | 42 | 58 | 76 | 96 | 120 | 147 |
| 1500 | 20 | 33 | 48 | 66 | 86 | 109 | 136 |
| 1600 | 10 | 23 | 38 | 55 | 75 | 98 | 124 |
| 1700 | 0 | 12 | 26 | 43 | 63 | 85 | 111 |
| 1800 | 11 | 0 | 14 | 30 | 49 | 71 | 97 |
| 1900 | 24 | 13 | 0 | 16 | 34 | 56 | 81 |
| 2000 | 38 | 28 | 15 | 0 | 18 | 39 | 63 |
| 2100 | 53 | 44 | 32 | 17 | 0 | 20 | 44 |
| 2200 | 70 | 61 | 50 | 36 | 20 | 0 | 23 |
| 2300 | 88 | 80 | 70 | 57 | 41 | 22 | 0 |
| 2400 | 107 | 100 | 91 | 79 | 64 | 46 | 25 |
| 2500 | 128 | 123 | 115 | 104 | 90 | 73 | 52 |
| 2600 | 152 | 148 | 141 | 131 | 118 | 102 | 82 |
| 2700 | 178 | 175 | 170 | 161 | 149 | 134 | 115 |
| 2800 | 206 | 205 | 201 | 194 | 184 | 170 | 152 |
| 2900 | 237 | 238 | 236 | 231 | 222 | 210 | 194 |
| 3000 | 272 | 275 | 275 | 271 | 264 | 254 | 240 |
| 3100 | 311 | 316 | 318 | 316 | 311 | 303 | 291 |
| 3200 | 356 | 363 | 367 | 368 | 365 | 359 | 349 |
| 3300 | 409 | 418 | 425 | 428 | 428 | 424 | 416 |
| 3400 | 472 | 484 | 493 | 499 | 502 | 501 | 495 |
| 3500 | 550 | 565 | 577 | 586 | 592 | 594 | 591 |
| 3600 | 651 | 671 | 688 | 702 | 712 | 717 | 717 |
| 3700 | 831 | 859 | 884 | 905 | 921 | 931 | 936 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Horizontal Distance from the Gun – meters | | | | | | | Range |
|---|---|---|---|---|---|---|---|
| 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | meters |
| 241 | 275 | 313 | 355 | 401 | 452 | 508 | 0 |
| 239 | 274 | 312 | 354 | 400 | 451 | 507 | 100 |
| 238 | 273 | 311 | 353 | 399 | 450 | 506 | 200 |
| 237 | 271 | 309 | 351 | 397 | 448 | 504 | 300 |
| 235 | 269 | 307 | 349 | 395 | 446 | 502 | 400 |
| 233 | 267 | 305 | 347 | 393 | 444 | 501 | 500 |
| 230 | 264 | 302 | 344 | 391 | 442 | 499 | 600 |
| 227 | 261 | 299 | 341 | 388 | 439 | 496 | 700 |
| 223 | 257 | 295 | 337 | 384 | 435 | 492 | 800 |
| 218 | 252 | 290 | 332 | 379 | 430 | 487 | 900 |
| 212 | 246 | 284 | 326 | 373 | 425 | 482 | 1000 |
| 205 | 239 | 277 | 319 | 366 | 418 | 476 | 1100 |
| 197 | 231 | 269 | 311 | 358 | 410 | 468 | 1200 |
| 188 | 222 | 260 | 302 | 349 | 401 | 459 | 1300 |
| 178 | 212 | 250 | 292 | 339 | 391 | 449 | 1400 |
| 167 | 201 | 239 | 281 | 328 | 380 | 438 | 1500 |
| 154 | 188 | 226 | 268 | 315 | 367 | 425 | 1600 |
| 141 | 174 | 211 | 253 | 300 | 352 | 410 | 1700 |
| 126 | 158 | 195 | 237 | 284 | 336 | 394 | 1800 |
| 109 | 141 | 178 | 220 | 266 | 318 | 376 | 1900 |
| 91 | 123 | 160 | 201 | 247 | 298 | 356 | 2000 |
| 71 | 103 | 139 | 180 | 226 | 277 | 334 | 2100 |
| 50 | 81 | 116 | 157 | 202 | 253 | 310 | 2200 |
| 26 | 56 | 91 | 131 | 176 | 227 | 284 | 2300 |
| 0 | 29 | 63 | 102 | 147 | 198 | 255 | 2400 |
| 28 | 0 | 33 | 71 | 115 | 165 | 222 | 2500 |
| 59 | 32 | 0 | 37 | 80 | 129 | 186 | 2600 |
| 93 | 67 | 36 | 0 | 42 | 90 | 146 | 2700 |
| 131 | 106 | 76 | 41 | 0 | 47 | 102 | 2800 |
| 174 | 150 | 121 | 87 | 47 | 0 | 54 | 2900 |
| 222 | 199 | 171 | 138 | 99 | 53 | 0 | 3000 |
| 275 | 254 | 227 | 195 | 157 | 112 | 60 | 3100 |
| 335 | 316 | 291 | 260 | 223 | 179 | 128 | 3200 |
| 404 | 387 | 364 | 335 | 299 | 256 | 206 | 3300 |
| 485 | 470 | 449 | 422 | 388 | 346 | 296 | 3400 |
| 583 | 570 | 551 | 526 | 494 | 454 | 405 | 3500 |
| 712 | 702 | 685 | 661 | 630 | 591 | 543 | 3600 |
| 935 | 927 | 912 | 889 | 858 | 818 | 767 | 3700 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Range meters | Horizontal Distance from the Gun - meters | | | | | | |
|---|---|---|---|---|---|---|---|
| | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 |
| 0 | 570 | 638 | 713 | 796 | 888 | 990 | 1102 |
| 100 | 569 | 637 | 712 | 795 | 887 | 989 | 1102 |
| 200 | 568 | 636 | 711 | 794 | 887 | 989 | 1101 |
| 300 | 566 | 634 | 710 | 794 | 887 | 989 | 1101 |
| 400 | 564 | 633 | 709 | 793 | 886 | 988 | 1101 |
| 500 | 563 | 632 | 708 | 792 | 885 | 988 | 1101 |
| 600 | 561 | 630 | 706 | 790 | 884 | 987 | 1101 |
| 700 | 558 | 627 | 704 | 789 | 883 | 986 | 1100 |
| 800 | 555 | 624 | 701 | 787 | 881 | 985 | 1100 |
| 900 | 551 | 621 | 698 | 784 | 879 | 984 | 1100 |
| 1000 | 546 | 616 | 694 | 780 | 876 | 982 | 1100 |
| 1100 | 540 | 611 | 689 | 776 | 872 | 979 | 1099 |
| 1200 | 533 | 604 | 683 | 770 | 867 | 975 | 1096 |
| 1300 | 524 | 596 | 675 | 763 | 861 | 970 | 1092 |
| 1400 | 514 | 586 | 666 | 755 | 854 | 964 | 1087 |
| 1500 | 503 | 575 | 655 | 745 | 845 | 956 | 1080 |
| 1600 | 490 | 562 | 643 | 733 | 834 | 947 | 1072 |
| 1700 | 475 | 548 | 629 | 720 | 822 | 936 | 1062 |
| 1800 | 459 | 532 | 613 | 705 | 808 | 923 | 1050 |
| 1900 | 441 | 514 | 596 | 688 | 792 | 908 | 1036 |
| 2000 | 421 | 494 | 576 | 669 | 773 | 890 | 1020 |
| 2100 | 399 | 472 | 554 | 647 | 752 | 870 | 1002 |
| 2200 | 375 | 448 | 530 | 623 | 728 | 847 | 981 |
| 2300 | 348 | 421 | 504 | 597 | 702 | 821 | 956 |
| 2400 | 319 | 392 | 475 | 568 | 673 | 792 | 927 |
| 2500 | 286 | 359 | 442 | 535 | 640 | 759 | 894 |
| 2600 | 250 | 323 | 405 | 498 | 603 | 722 | 857 |
| 2700 | 210 | 282 | 364 | 457 | 562 | 681 | 816 |
| 2800 | 165 | 237 | 319 | 411 | 516 | 635 | 770 |
| 2900 | 116 | 187 | 268 | 360 | 465 | 584 | 719 |
| 3000 | 61 | 131 | 212 | 304 | 409 | 528 | 663 |
| 3100 | 0 | 69 | 149 | 241 | 346 | 465 | 601 |
| 3200 | 69 | 0 | 79 | 170 | 275 | 395 | 532 |
| 3300 | 147 | 79 | 0 | 91 | 196 | 317 | 455 |
| 3400 | 238 | 170 | 91 | 0 | 106 | 228 | 368 |
| 3500 | 347 | 279 | 200 | 108 | 0 | 125 | 269 |
| 3600 | 485 | 416 | 335 | 240 | 129 | 0 | 150 |
| 3700 | 704 | 629 | 540 | 435 | 312 | 168 | 0 |

NOTE: Red figures indicate negative ordinates.

Part 2

Cartridge, Ball, M80

Muzzle Velocity - 839.7 m/s

Drag Function - $G_{7.1}$

| Elevation, $\phi$, in mils | Ballistic Coefficient |
|---|---|
| $0 \leq \phi \leq 2.5$ | $(0.2134612) - (0.2384479 \times 10^{-2})\ \phi$ |
| $2.5 \leq \phi \leq 12$ | $(0.21586438) - (0.44696192 \times 10^{-2})\ \phi$ $+ (0.51849166 \times 10^{-3})\ \phi^2 - (0.29140925 \times 10^{-4})\ \phi^3$ $+ (0.62518175 \times 10^{-6})\ \phi^4$ |
| $12 \leq \phi \leq 200$ | $(0.20360254) - (0.39384894 \times 10^{-3})\ \phi$ $+ (0.46325143 \times 10^{-5})\ \phi^2 - (0.25725943 \times 10^{-7})\ \phi^3$ $+ (0.49108887 \times 10^{-10})\ \phi^4$ |
| $200 \leq \phi$ | $(0.1941944) - (0.56472 \times 10^{-4})\ \phi$ |

| Range | Angle of Elevation | Difference | Vertical 100% Cone | | Effective 82% Beaten Zone | | | Angle of Fall | Time of Flight |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Width | | Lgth | | |
| m | mil | mil | mil | m | mil | m | m | mil | sec |
| 100 | .8 | | 2.7 | 0.3 | | | | 1 | .12 |
| | | .8 | | | | | | | |
| 200 | 1.6 | | 2.4 | 0.5 | | | | 2 | .26 |
| | | 1.0 | | | | | | | |
| 300 | 2.6 | | 2.2 | 0.6 | | | | 3 | .41 |
| | | 1.1 | | | | | | | |
| 400 | 3.7 | | 2.4 | 1.0 | | | | 5 | .58 |
| | | 1.3 | | | | | | | |
| 500 | 5.0 | | 2.4 | 1.2 | 2 | 1 | 85 | 7 | .77 |
| | | 1.6 | | | | | | | |
| 600 | 6.6 | | 2.5 | 1.5 | | | | 10 | .99 |
| | | 1.9 | | | | | | | |
| 700 | 8.5 | | 2.7 | 1.8 | | | | 14 | 1.24 |
| | | 2.3 | | | | | | | |
| 800 | 10.8 | | 3.1 | 2.4 | | | | 20 | 1.52 |
| | | 2.7 | | | | | | | |
| 900 | 13.5 | | 3.4 | 3.0 | | | | 27 | 1.83 |
| | | 3.2 | | | | | | | |
| 1000 | 16.7 | | 3.6 | 3.5 | 2 | 2 | 53 | 34 | 2.16 |
| | | 3.8 | | | | | | | |
| 1100 | 20.5 | | 4.0 | 4.3 | | | | 43 | 2.51 |
| | | 4.3 | | | | | | | |
| 1200 | 24.8 | | 4.3 | 5.0 | | | | 52 | 2.88 |
| | | 4.7 | | | | | | | |
| 1300 | 29.5 | | 4.6 | 5.9 | | | | 62 | 3.27 |
| | | 5.2 | | | | | | | |
| 1400 | 34.7 | | 5.0 | 6.9 | | | | 73 | 3.67 |
| | | 5.6 | | | | | | | |
| 1500 | 40.3 | | 5.5 | 8.0 | 2 | 3 | 48 | 85 | 4.09 |
| | | 6.1 | | | | | | | |
| 1600 | 46.4 | | 6.0 | 9.4 | | | | 98 | 4.55 |
| | | 6.6 | | | | | | | |
| 1700 | 53.0 | | 6.5 | 10.9 | | | | 113 | 5.00 |
| | | 7.1 | | | | | | | |
| 1800 | 60.1 | | 7.1 | 12.6 | | | | 129 | 5.48 |
| | | 7.7 | | | | | | | |
| 1900 | 67.8 | | 7.8 | 14.6 | | | | 146 | 5.99 |
| | | 8.3 | | | | | | | |
| 2000 | 76.1 | | 8.5 | 16.7 | 2 | 4 | 51 | 165 | 6.52 |
| | | 8.9 | | | | | | | |
| 2100 | 85.0 | | 9.3 | 19.2 | | | | 186 | 7.08 |
| | | 9.6 | | | | | | | |
| 2200 | 94.6 | | 10.2 | 22.1 | | | | 209 | 7.67 |
| | | 10.4 | | | | | | | |
| 2300 | 105.0 | | 11.1 | 25.0 | | | | 234 | 8.28 |
| | | 11.3 | | | | | | | |
| 2400 | 116.3 | | 12.2 | 28.7 | | | | 262 | 8.92 |
| | | 12.3 | | | | | | | |
| 2500 | 128.6 | | 13.4 | 32.8 | 3 | 6 | 56 | 293 | 9.61 |
| | | 13.6 | | | | | | | |
| 2600 | 142.2 | | 14.9 | 37.9 | | | | 327 | 10.35 |
| | | 15.3 | | | | | | | |
| 2700 | 157.5 | | 16.4 | 43.6 | | | | 366 | 11.15 |
| | | 17.2 | | | | | | | |
| 2800 | 174.7 | | 18.3 | 50.4 | | | | 411 | 12.02 |
| | | 19.2 | | | | | | | |
| 2900 | 193.9 | | 20.4 | 58.2 | | | | 460 | 12.95 |
| | | 21.2 | | | | | | | |
| 3000 | 215.1 | | 23.0 | 67.8 | 3 | 9 | 62 | 513 | 13.95 |
| | | 23.8 | | | | | | | |
| 3100 | 238.9 | | 25.8 | 78.5 | | | | 571 | 15.04 |
| | | 27.8 | | | | | | | |
| 3200 | 266.7 | | 29.5 | 92.6 | | | | 638 | 16.27 |
| | | 34.0 | | | | | | | |
| 3300 | 300.7 | | 34.1 | 110.6 | | | | 714 | 17.68 |
| | | 43.7 | | | | | | | |
| 3400 | 344.4 | | 40.4 | 135.0 | | | | 804 | 19.43 |
| | | 67.5 | | | | | | | |
| 3500 | 411.9 | | 51.1 | 175.9 | 3 | 12 | 68 | 926 | 21.93 |
| 3549 | 506.0 | | | | | | | | |

Overhead Fire

| 1 | 2 | | 3 | |
|---|---|---|---|---|
| Troop Distance | Minimum Angle of Elevation | Difference | Corresponding Range | |
| | | | Exact Figure | Even Figure (to nearest 25 above) |
| meters | mils | mils | meters | meters |
| 100 | 76.2 | | 2001 | 2025 |
| 200 | 40.2 | -36.0 | 1498 | 1500 |
| 300 | 29.5 | -10.7 | 1299 | 1300 |
| 400 | 25.0 | -4.5 | 1205 | 1225 |
| 500 | 23.3 | -1.7 | 1165 | 1175 |
| 600 | 23.2 | -0.1 | 1162 | 1175 |
| 700 | 25.2 | 2.0 | 1209 | 1225 |
| 800 | 28.3 | 3.1 | 1275 | 1275 |
| 900 | 32.0 | 3.7 | 1348 | 1350 |
| 1000 | 36.4 | 4.4 | 1431 | 1450 |
| 1100 | 41.9 | 5.5 | 1526 | 1550 |
| 1200 | 48.0 | 6.1 | 1624 | 1625 |
| 1300 | 54.8 | 6.8 | 1725 | 1725 |
| 1400 | 62.3 | 7.5 | 1829 | 1850 |
| 1500 | 70.8 | 8.5 | 1936 | 1950 |
| 1600 | 80.1 | 9.3 | 2045 | 2050 |
| 1700 | 90.2 | 10.1 | 2154 | 2175 |
| 1800 | 101.3 | 11.1 | 2264 | 2275 |
| 1900 | 113.5 | 12.2 | 2375 | 2375 |
| 2000 | 127.0 | 13.5 | 2487 | 2500 |
| 2100 | 142.2 | 15.2 | 2600 | 2600 |
| 2200 | 159.7 | 17.5 | 2713 | 2725 |
| 2300 | 179.5 | 19.8 | 2825 | 2825 |
| 2400 | 202.0 | 22.5 | 2938 | 2950 |
| 2500 | 226.8 | 24.8 | 3049 | 3050 |
| 2600 | 255.9 | 29.1 | 3161 | 3175 |
| 2700 | 291.2 | 35.3 | 3272 | 3275 |
| 2800 | 337.8 | 46.6 | 3385 | 3400 |
| 2900 | 441.9 | 104.1 | 3500 | 3500 |

Ordinates in Meters

| Range meters | Horizontal Distance from the Gun – meters | | | | | | |
|---|---|---|---|---|---|---|---|
| | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 0 | 0 | -1 | -1 | -1 | -3 | -4 | -6 |
| 100 | 0 | 0 | -1 | -1 | -2 | -3 | -5 |
| 200 | 0 | 0 | 0 | -1 | -2 | -3 | -5 |
| 300 | 0 | 0 | 0 | 0 | -1 | -2 | -4 |
| 400 | 0 | 0 | 0 | 0 | -1 | -2 | -3 |
| 500 | 0 | 1 | 1 | 0 | 0 | -1 | -2 |
| 600 | 1 | 1 | 1 | 1 | 1 | 0 | -1 |
| 700 | 1 | 1 | 2 | 2 | 2 | 1 | 0 |
| 800 | 1 | 2 | 2 | 3 | 3 | 2 | 2 |
| 900 | 1 | 2 | 3 | 4 | 4 | 4 | 3 |
| 1000 | 2 | 3 | 4 | 5 | 6 | 6 | 6 |
| 1100 | 2 | 4 | 5 | 7 | 8 | 8 | 8 |
| 1200 | 2 | 5 | 7 | 8 | 10 | 11 | 11 |
| 1300 | 3 | 5 | 8 | 10 | 12 | 13 | 14 |
| 1400 | 3 | 6 | 9 | 12 | 14 | 16 | 18 |
| 1500 | 4 | 8 | 11 | 14 | 17 | 20 | 22 |
| 1600 | 4 | 9 | 13 | 17 | 20 | 23 | 26 |
| 1700 | 5 | 10 | 15 | 19 | 24 | 27 | 30 |
| 1800 | 6 | 12 | 17 | 22 | 27 | 31 | 35 |
| 1900 | 7 | 13 | 19 | 25 | 31 | 36 | 41 |
| 2000 | 7 | 15 | 22 | 28 | 35 | 41 | 46 |
| 2100 | 8 | 16 | 24 | 32 | 39 | 46 | 52 |
| 2200 | 9 | 18 | 27 | 36 | 44 | 52 | 59 |
| 2300 | 10 | 20 | 30 | 40 | 49 | 58 | 66 |
| 2400 | 11 | 23 | 34 | 44 | 55 | 65 | 74 |
| 2500 | 13 | 25 | 37 | 49 | 61 | 72 | 83 |
| 2600 | 14 | 28 | 41 | 55 | 68 | 80 | 92 |
| 2700 | 16 | 31 | 46 | 61 | 75 | 89 | 103 |
| 2800 | 17 | 34 | 51 | 68 | 84 | 100 | 115 |
| 2900 | 19 | 38 | 57 | 75 | 94 | 111 | 128 |
| 3000 | 21 | 42 | 63 | 84 | 104 | 124 | 143 |
| 3100 | 24 | 47 | 71 | 94 | 117 | 139 | 161 |
| 3200 | 27 | 53 | 80 | 106 | 131 | 156 | 181 |
| 3300 | 30 | 60 | 90 | 120 | 149 | 178 | 206 |
| 3400 | 35 | 70 | 105 | 139 | 173 | 206 | 239 |
| 3500 | 43 | 85 | 127 | 169 | 211 | 251 | 291 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Horizontal Distance from the Gun - meters | | | | | | | Range |
|---|---|---|---|---|---|---|---|
| 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | meters |
| 8 | 12 | 16 | 21 | 27 | 33 | 42 | 0 |
| 7 | 11 | 15 | 20 | 26 | 33 | 42 | 100 |
| 7 | 10 | 14 | 19 | 25 | 33 | 42 | 200 |
| 6 | 9 | 13 | 18 | 24 | 32 | 41 | 300 |
| 5 | 8 | 12 | 17 | 23 | 31 | 40 | 400 |
| 4 | 7 | 11 | 16 | 22 | 30 | 38 | 500 |
| 3 | 6 | 10 | 14 | 21 | 28 | 37 | 600 |
| 2 | 4 | 8 | 13 | 18 | 26 | 34 | 700 |
| 0 | 2 | 6 | 10 | 16 | 23 | 31 | 800 |
| 2 | 0 | 3 | 7 | 13 | 20 | 28 | 900 |
| 5 | 3 | 0 | 4 | 9 | 16 | 24 | 1000 |
| 8 | 6 | 4 | 0 | 5 | 11 | 19 | 1100 |
| 11 | 10 | 8 | 5 | 0 | 6 | 13 | 1200 |
| 15 | 14 | 12 | 9 | 5 | 0 | 7 | 1300 |
| 19 | 18 | 17 | 15 | 11 | 6 | 0 | 1400 |
| 23 | 23 | 23 | 21 | 18 | 13 | 8 | 1500 |
| 28 | 29 | 29 | 27 | 25 | 21 | 16 | 1600 |
| 33 | 35 | 35 | 34 | 33 | 29 | 25 | 1700 |
| 39 | 41 | 42 | 42 | 41 | 38 | 34 | 1800 |
| 45 | 48 | 50 | 50 | 50 | 48 | 45 | 1900 |
| 51 | 55 | 58 | 59 | 60 | 58 | 56 | 2000 |
| 58 | 63 | 66 | 69 | 70 | 70 | 68 | 2100 |
| 66 | 71 | 76 | 79 | 81 | 82 | 81 | 2200 |
| 74 | 80 | 86 | 90 | 93 | 95 | 95 | 2300 |
| 83 | 90 | 97 | 102 | 107 | 109 | 111 | 2400 |
| 92 | 101 | 109 | 116 | 121 | 125 | 127 | 2500 |
| 103 | 113 | 123 | 131 | 137 | 142 | 146 | 2600 |
| 115 | 127 | 138 | 147 | 155 | 162 | 167 | 2700 |
| 129 | 143 | 155 | 166 | 175 | 184 | 190 | 2800 |
| 145 | 160 | 174 | 187 | 198 | 208 | 217 | 2900 |
| 162 | 179 | 195 | 210 | 223 | 235 | 246 | 3000 |
| 181 | 201 | 219 | 237 | 252 | 266 | 279 | 3100 |
| 204 | 227 | 248 | 268 | 286 | 303 | 318 | 3200 |
| 233 | 258 | 283 | 306 | 328 | 348 | 366 | 3300 |
| 270 | 300 | 329 | 357 | 383 | 407 | 429 | 3400 |
| 330 | 367 | 403 | 438 | 470 | 501 | 530 | 3500 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Range | Horizontal Distance from the Gun - meters | | | | | | |
|---|---|---|---|---|---|---|---|
| meters | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 |
| 0 | 54 | 66 | 79 | 94 | 112 | 131 | 153 |
| 100 | 53 | 65 | 78 | 94 | 111 | 131 | 153 |
| 200 | 52 | 64 | 78 | 93 | 111 | 131 | 153 |
| 300 | 51 | 63 | 77 | 93 | 111 | 131 | 153 |
| 400 | 50 | 62 | 76 | 92 | 110 | 130 | 153 |
| 500 | 49 | 61 | 75 | 91 | 109 | 129 | 152 |
| 600 | 47 | 59 | 73 | 89 | 107 | 127 | 150 |
| 700 | 45 | 56 | 70 | 86 | 103 | 124 | 147 |
| 800 | 42 | 53 | 67 | 82 | 100 | 120 | 143 |
| 900 | 38 | 49 | 63 | 78 | 96 | 116 | 138 |
| 1000 | 33 | 45 | 58 | 73 | 90 | 110 | 132 |
| 1100 | 28 | 39 | 52 | 67 | 84 | 103 | 126 |
| 1200 | 22 | 33 | 45 | 60 | 76 | 96 | 118 |
| 1300 | 15 | 26 | 38 | 52 | 68 | 87 | 109 |
| 1400 | 8 | 18 | 30 | 43 | 59 | 78 | 99 |
| 1500 | 0 | 9 | 21 | 34 | 49 | 68 | 88 |
| 1600 | 9 | 0 | 11 | 24 | 39 | 56 | 77 |
| 1700 | 18 | 10 | 0 | 12 | 27 | 44 | 64 |
| 1800 | 29 | 21 | 12 | 0 | 14 | 30 | 49 |
| 1900 | 40 | 33 | 24 | 13 | 0 | 16 | 34 |
| 2000 | 52 | 46 | 38 | 27 | 15 | 0 | 18 |
| 2100 | 65 | 59 | 52 | 43 | 31 | 17 | 0 |
| 2200 | 79 | 74 | 68 | 60 | 49 | 35 | 19 |
| 2300 | 94 | 90 | 85 | 77 | 68 | 55 | 40 |
| 2400 | 110 | 108 | 103 | 97 | 88 | 77 | 62 |
| 2500 | 128 | 127 | 124 | 118 | 110 | 100 | 87 |
| 2600 | 148 | 148 | 146 | 142 | 135 | 126 | 114 |
| 2700 | 170 | 171 | 171 | 168 | 163 | 155 | 144 |
| 2800 | 195 | 198 | 199 | 197 | 193 | 187 | 177 |
| 2900 | 223 | 228 | 230 | 230 | 228 | 223 | 214 |
| 3000 | 254 | 260 | 265 | 267 | 266 | 262 | 256 |
| 3100 | 290 | 298 | 305 | 309 | 310 | 308 | 303 |
| 3200 | 331 | 343 | 351 | 358 | 361 | 362 | 359 |
| 3300 | 382 | 396 | 408 | 417 | 423 | 426 | 426 |
| 3400 | 449 | 467 | 483 | 495 | 505 | 511 | 513 |
| 3500 | 556 | 579 | 600 | 618 | 632 | 643 | 649 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Horizontal Distance from the Gun – meters | | | | | | | Range |
|---|---|---|---|---|---|---|---|
| 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | meters |
| 178 | 205 | 236 | 269 | 305 | 346 | 397 | 0 |
| 178 | 205 | 236 | 269 | 307 | 348 | 393 | 100 |
| 178 | 206 | 236 | 270 | 308 | 350 | 396 | 200 |
| 178 | 206 | 237 | 272 | 310 | 353 | 399 | 300 |
| 178 | 206 | 238 | 273 | 312 | 355 | 402 | 400 |
| 177 | 206 | 238 | 273 | 312 | 356 | 404 | 500 |
| 176 | 204 | 236 | 272 | 311 | 355 | 403 | 600 |
| 173 | 201 | 233 | 269 | 309 | 352 | 401 | 700 |
| 169 | 197 | 229 | 265 | 305 | 349 | 397 | 800 |
| 164 | 192 | 224 | 260 | 299 | 343 | 392 | 900 |
| 158 | 186 | 218 | 253 | 293 | 337 | 386 | 1000 |
| 151 | 179 | 210 | 246 | 285 | 329 | 378 | 1100 |
| 142 | 170 | 202 | 237 | 276 | 320 | 369 | 1200 |
| 133 | 161 | 192 | 227 | 266 | 310 | 359 | 1300 |
| 123 | 151 | 182 | 216 | 255 | 299 | 347 | 1400 |
| 112 | 139 | 170 | 204 | 242 | 286 | 334 | 1500 |
| 100 | 126 | 156 | 190 | 229 | 271 | 319 | 1600 |
| 86 | 112 | 142 | 175 | 213 | 256 | 303 | 1700 |
| 72 | 97 | 126 | 159 | 196 | 238 | 285 | 1800 |
| 56 | 81 | 109 | 141 | 178 | 219 | 266 | 1900 |
| 39 | 63 | 90 | 122 | 158 | 199 | 245 | 2000 |
| 20 | 43 | 70 | 101 | 136 | 176 | 222 | 2100 |
| 0 | 22 | 49 | 79 | 113 | 152 | 197 | 2200 |
| 22 | 0 | 25 | 55 | 88 | 127 | 170 | 2300 |
| 45 | 24 | 0 | 28 | 61 | 99 | 141 | 2400 |
| 70 | 51 | 27 | 0 | 32 | 69 | 111 | 2500 |
| 98 | 80 | 57 | 31 | 0 | 36 | 77 | 2600 |
| 129 | 112 | 91 | 65 | 35 | 0 | 40 | 2700 |
| 164 | 148 | 127 | 103 | 74 | 40 | 0 | 2800 |
| 203 | 188 | 169 | 145 | 117 | 84 | 45 | 2900 |
| 246 | 232 | 215 | 193 | 166 | 134 | 96 | 3000 |
| 295 | 283 | 267 | 246 | 221 | 190 | 153 | 3100 |
| 353 | 342 | 328 | 309 | 284 | 255 | 219 | 3200 |
| 422 | 414 | 401 | 384 | 361 | 332 | 297 | 3300 |
| 512 | 506 | 495 | 480 | 458 | 431 | 396 | 3400 |
| 651 | 649 | 640 | 626 | 606 | 579 | 544 | 3500 |

NOTE: Red figures indicate negative ordinates.

Ordinates in Meters

| Range | Horizontal Distance from the Gun – meters | | | | | | |
|---|---|---|---|---|---|---|---|
| meters | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 |
| 0 | 440 | 494 | 552 | 618 | 692 | 772 | 859 |
| 100 | 443 | 498 | 558 | 625 | 699 | 780 | 869 |
| 200 | 446 | 502 | 564 | 632 | 706 | 788 | 879 |
| 300 | 451 | 508 | 570 | 640 | 716 | 800 | 893 |
| 400 | 455 | 512 | 576 | 647 | 725 | 811 | 906 |
| 500 | 457 | 515 | 580 | 652 | 731 | 819 | 916 |
| 600 | 457 | 516 | 582 | 654 | 734 | 823 | 922 |
| 700 | 455 | 515 | 581 | 654 | 734 | 824 | 923 |
| 800 | 451 | 511 | 577 | 651 | 732 | 822 | 922 |
| 900 | 446 | 506 | 572 | 646 | 728 | 818 | 919 |
| 1000 | 440 | 500 | 567 | 640 | 722 | 813 | 914 |
| 1100 | 432 | 492 | 559 | 633 | 715 | 807 | 909 |
| 1200 | 423 | 483 | 550 | 625 | 707 | 799 | 901 |
| 1300 | 413 | 473 | 540 | 615 | 697 | 790 | 892 |
| 1400 | 401 | 461 | 528 | 603 | 686 | 778 | 882 |
| 1500 | 388 | 448 | 515 | 589 | 672 | 765 | 868 |
| 1600 | 373 | 433 | 500 | 574 | 657 | 750 | 853 |
| 1700 | 356 | 416 | 482 | 557 | 639 | 732 | 835 |
| 1800 | 338 | 397 | 463 | 537 | 619 | 712 | 815 |
| 1900 | 318 | 377 | 442 | 516 | 598 | 689 | 792 |
| 2000 | 296 | 354 | 419 | 492 | 573 | 664 | 767 |
| 2100 | 273 | 330 | 394 | 466 | 547 | 637 | 739 |
| 2200 | 247 | 303 | 367 | 438 | 518 | 608 | 709 |
| 2300 | 220 | 275 | 338 | 409 | 488 | 577 | 677 |
| 2400 | 190 | 245 | 307 | 377 | 455 | 544 | 643 |
| 2500 | 158 | 213 | 274 | 343 | 421 | 509 | 608 |
| 2600 | 124 | 178 | 238 | 307 | 385 | 472 | 571 |
| 2700 | 87 | 140 | 200 | 268 | 346 | 433 | 532 |
| 2800 | 46 | 98 | 158 | 226 | 304 | 391 | 491 |
| 2900 | 0 | 52 | 112 | 180 | 257 | 345 | 445 |
| 3000 | 51 | 0 | 59 | 127 | 204 | 292 | 392 |
| 3100 | 109 | 59 | 0 | 67 | 144 | 233 | 333 |
| 3200 | 176 | 126 | 68 | 0 | 77 | 166 | 268 |
| 3300 | 255 | 205 | 147 | 79 | 0 | 91 | 195 |
| 3400 | 354 | 304 | 244 | 175 | 94 | 0 | 109 |
| 3500 | 500 | 447 | 384 | 309 | 222 | 119 | 0 |

NOTE: Red figures indicate negative ordinates.

[AG 063 (26 Jan 62)]

BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
*General, United States Army,*
*Chief of Staff.*

Official:

J. C. LAMBERT,
*Major General, United States Army,*
*The Adjutant General.*

Distribution:

*Active Army:*

DCSLOG (1)
CNGB (1)
Tech Stf, DA (1) except
  CofOrd (9)
Ord Bd (2)
USCONARC (3)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (2) except
  USAREUR (3)
  USARJ (3)
OS Base Comd (2)
LOGCOMD (2)
Ord Comd (2)
MDW (2)
Armies (3) except
  EUSA (2)
Corps (2)
Div (2)
Bde (2)
Rgt/Gp/BG (2)
Bn (2)
Co/Btry (2)
Instl (2)
GENDEP (2)
Ord Sec, GENDEP (1)
Ord Dep (2)
Ord Arsenals (2) except
  Raritan (10)
Springfield Armory (2)
Ord Dist (2)
Ord PG (2)
Br Svc Sch (2)
OSA (2)
POE (2)
Mil Msn (1)
MAAG (2)
USA Corps (2)

*NG:* None.

*USAR:* None.

For explanation of abbreviations used, see AR 320–50.

U.S. GOVERNMENT PRINTING OFFICE: 1962 O—630973

# Firing Tables
for

Machine Gun, 7.62mm: M60
on
Mount, Machine Gun: 7.62mm, M122

and

Machine Gun, 7.62mm: M73
on
Tank, Combat, Full Tracked: 105mm Gun, M60 Series

and

Rifle, 7.62mm: M14

Firing

Cartridge, 7.62mm: Ball, NATO, M59
Cartridge, 7.62mm: Ball, NATO, M80
Cartridge, 7.62mm: AP, NATO, M61
Cartridge, 7.62mm: Tracer, NATO, M62

Change No. 1

Headquarters, Department of the Army
Washington, D. C., 30 October 1964

FT 7.62-A-2, 1 January 1962, is changed as follows:

1. The title is changed as shown above.

2. To the table of contents on page 1 add

| | Page |
|---|---|
| Part 3 | 23 |
| Part 4 | 25 |

3. Delete Table B (pages 9 and 17) and the explanation of Table B contained on pages 4 and 5.

4. Insert the following paragraphs after the fourth paragraph on page 3 of the introduction.

The firings mentioned above pertain only to the dispersion data for the M60 machine gun on the M122 tripod mount. The dispersion data for the M73 machine gun mounted in the M60 tank are based on firings conducted during 1963 and 1964 and are recorded in Firing Record No. S-46460. These data, like those for the M60 machine gun, are dependent on the firing conditions and should therefore be treated as approximations.

Table C of Parts 1 and 2 are applicable to Parts 3 and 4, respectively. The ballistic data provided on pages 7 and 15 apply to both the tank mounted M73 machine gun and the M60 machine gun on the M122 mount.

5. Insert the attached pages 23 through 26 after page 22.

Part 3

Cartridge, Ball, M59
Cartridge, AP, M61
Cartridge, Tracer, M62

fired from

Machine Gun, M73

Machine Gun, M73
Cartridge, Ball, M59

Part 3 Table A

| Range | Angle of Elevation | Difference | Vertical 100% Cone | | Effective 82% Beaten Zone | | | Angle of Fall | Time of Flight |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Width | | Length | | |
| m | mil | mil | mil | m | mil | m | m | mil | sec |
| 100 | 0.7 | | 0.6 | 0.1 | | | | 1 | 0.1 |
| | | 0.9 | | | | | | | |
| 200 | 1.6 | | 0.6 | 0.1 | | | | 2 | 0.3 |
| | | 1.0 | | | | | | | |
| 300 | 2.6 | | 0.6 | 0.2 | | | | 3 | 0.4 |
| | | 1.1 | | | | | | | |
| 400 | 3.7 | | 0.8 | 0.3 | | | | 5 | 0.6 |
| | | 1.3 | | | | | | | |
| 500 | 5.0 | | 0.9 | 0.4 | 3 | 1 | 32 | 7 | 0.8 |
| | | 1.5 | | | | | | | |
| 600 | 6.5 | | 1.1 | 0.6 | | | | 10 | 1.0 |
| | | 1.8 | | | | | | | |
| 700 | 8.3 | | 1.4 | 0.9 | | | | 14 | 1.2 |
| | | 2.2 | | | | | | | |
| 800 | 10.5 | | 1.7 | 1.3 | | | | 19 | 1.5 |
| | | 2.6 | | | | | | | |
| 900 | 13.1 | | 2.1 | 1.8 | | | | 26 | 1.8 |
| | | 3.1 | | | | | | | |
| 1000 | 16.2 | | 2.5 | 2.4 | 3 | 3 | 37 | 33 | 2.1 |
| | | 3.7 | | | | | | | |
| 1100 | 19.9 | | 3.0 | 3.2 | | | | 42 | 2.5 |
| | | 4.2 | | | | | | | |
| 1200 | 24.1 | | 3.4 | 4.0 | | | | 51 | 2.8 |
| | | 4.7 | | | | | | | |
| 1300 | 28.8 | | 3.9 | 5.0 | | | | 61 | 3.2 |
| | | 5.2 | | | | | | | |
| 1400 | 34.0 | | 4.4 | 6.1 | | | | 72 | 3.6 |
| | | 5.7 | | | | | | | |
| 1500 | 39.7 | | 5.0 | 7.4 | 3 | 4 | 45 | 84 | 4.1 |
| | | 6.2 | | | | | | | |
| 1600 | 45.9 | | 5.6 | 8.9 | | | | 97 | 4.5 |
| | | 6.7 | | | | | | | |
| 1700 | 52.6 | | 6.3 | 10.5 | | | | 111 | 5.0 |
| | | 7.3 | | | | | | | |
| 1800 | 59.9 | | 7.1 | 12.6 | | | | 128 | 5.5 |
| | | 7.9 | | | | | | | |
| 1900 | 67.8 | | 8.0 | 15.0 | | | | 146 | 6.0 |
| | | 8.6 | | | | | | | |
| 2000 | 76.4 | | 9.0 | 17.7 | 3 | 6 | 54 | 166 | 6.5 |
| | | 9.4 | | | | | | | |
| 2100 | 85.8 | | 10.1 | 20.9 | | | | 188 | 7.1 |
| | | 10.3 | | | | | | | |
| 2200 | 96.1 | | 11.4 | 24.6 | | | | 213 | 7.7 |
| | | 11.2 | | | | | | | |
| 2300 | 107.3 | | 12.8 | 28.9 | | | | 240 | 8.4 |
| | | 12.1 | | | | | | | |
| 2400 | 119.4 | | 14.5 | 34.1 | | | | 271 | 9.1 |
| | | 13.1 | | | | | | | |
| 2500 | 132.5 | | 16.3 | 39.9 | 3 | 7 | 65 | 304 | 9.8 |
| | | 14.3 | | | | | | | |
| 2600 | 146.8 | | 18.3 | 46.8 | | | | 341 | 10.5 |
| | | 15.7 | | | | | | | |
| 2700 | 162.5 | | 20.7 | 54.8 | | | | 381 | 11.3 |
| | | 17.4 | | | | | | | |
| 2800 | 179.9 | | 23.3 | 64.2 | | | | 425 | 12.2 |
| | | 19.3 | | | | | | | |
| 2900 | 199.2 | | 26.5 | 75.5 | | | | 475 | 13.2 |
| | | 21.4 | | | | | | | |
| 3000 | 220.6 | | 30.0 | 88.5 | 3 | 8 | 78 | 527 | 14.2 |
| | | 23.8 | | | | | | | |
| 3100 | 244.4 | | 34.2 | 104.2 | | | | 585 | 15.2 |
| | | 26.7 | | | | | | | |
| 3200 | 271.1 | | 39.2 | 123.2 | | | | 648 | 16.4 |
| | | 30.6 | | | | | | | |
| 3300 | 301.7 | | 45.1 | 146.3 | | | | 716 | 17.7 |
| | | 36.0 | | | | | | | |
| 3400 | 337.7 | | 52.4 | 175.2 | | | | 790 | 19.2 |
| | | 43.5 | | | | | | | |
| 3500 | 381.2 | | 61.8 | 212.6 | 3 | 10 | 92 | 871 | 20.9 |
| | | 56.2 | | | | | | | |
| 3600 | 437.4 | | 74.6 | 264.2 | | | | 962 | 23.0 |
| | | 95.3 | | | | | | | |
| 3700 | 532.7 | | | | | | | 1088 | 26.4 |
| 3725 | 608.5 | | | | | | | 1167 | 29.0 |

Part 4

Cartridge, Ball, M80

fired from

Machine Gun, M73

Machine Gun, M73
Cartridge, Ball, M80

Part 4 Table A

| Range | Angle of Elevation | Difference | Vertical 100% Cone | | Effective 82% Beaten Zone | | | Angle of Fall | Time of Flight |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Width | | Length | | |
| m | mil | mil | mil | m | mil | m | m | mil | sec |
| 100 | 0.8 | 0.8 | 0.6 | 0.1 | | | | 1 | 0.1 |
| 200 | 1.6 | 1.0 | 0.7 | 0.1 | | | | 2 | 0.3 |
| 300 | 2.6 | 1.1 | 0.7 | 0.2 | | | | 3 | 0.4 |
| 400 | 3.7 | 1.3 | 0.9 | 0.4 | | | | 5 | 0.6 |
| 500 | 5.0 | 1.6 | 1.1 | 0.5 | 3 | 1 | 39 | 7 | 0.8 |
| 600 | 6.6 | 1.9 | 1.4 | 0.8 | | | | 10 | 1.0 |
| 700 | 8.5 | 2.3 | 1.7 | 1.2 | | | | 14 | 1.2 |
| 800 | 10.8 | 2.7 | 2.2 | 1.7 | | | | 20 | 1.5 |
| 900 | 13.5 | 3.2 | 2.8 | 2.4 | | | | 27 | 1.8 |
| 1000 | 16.7 | 3.8 | 3.2 | 3.2 | 3 | 3 | 48 | 34 | 2.2 |
| 1100 | 20.5 | 4.3 | 3.9 | 4.2 | | | | 43 | 2.5 |
| 1200 | 24.8 | 4.7 | 4.4 | 5.2 | | | | 52 | 2.9 |
| 1300 | 29.5 | 5.2 | 5.1 | 6.5 | | | | 62 | 3.3 |
| 1400 | 34.7 | 5.6 | 5.7 | 7.9 | | | | 73 | 3.7 |
| 1500 | 40.3 | 6.1 | 6.4 | 9.4 | 3 | 4 | 56 | 85 | 4.1 |
| 1600 | 46.4 | 6.6 | 7.2 | 11.2 | | | | 98 | 4.5 |
| 1700 | 53.0 | 7.1 | 8.0 | 13.4 | | | | 113 | 5.0 |
| 1800 | 60.1 | 7.7 | 8.9 | 15.7 | | | | 129 | 5.5 |
| 1900 | 67.8 | 8.3 | 9.8 | 18.3 | | | | 146 | 6.0 |
| 2000 | 76.1 | 8.9 | 10.9 | 21.3 | 3 | 6 | 65 | 165 | 6.5 |
| 2100 | 85.0 | 9.6 | 12.0 | 24.7 | | | | 186 | 7.1 |
| 2200 | 94.6 | 10.4 | 13.2 | 28.6 | | | | 209 | 7.7 |
| 2300 | 105.0 | 11.3 | 14.6 | 32.9 | | | | 234 | 8.3 |
| 2400 | 116.3 | 12.3 | 16.1 | 38.0 | | | | 262 | 8.9 |
| 2500 | 128.6 | 13.6 | 17.8 | 43.7 | 3 | 7 | 74 | 293 | 9.6 |
| 2600 | 142.2 | 15.3 | 19.7 | 50.3 | | | | 327 | 10.4 |
| 2700 | 157.5 | 17.2 | 21.9 | 58.2 | | | | 366 | 11.1 |
| 2800 | 174.7 | 19.2 | 24.6 | 67.6 | | | | 411 | 12.0 |
| 2900 | 193.9 | 21.2 | 27.6 | 78.5 | | | | 460 | 13.0 |
| 3000 | 215.1 | 23.8 | 30.9 | 91.1 | 3 | 8 | 83 | 513 | 13.9 |
| 3100 | 238.9 | 27.8 | 34.8 | 106.0 | | | | 571 | 15.0 |
| 3200 | 266.7 | 34.0 | 39.7 | 124.7 | | | | 638 | 16.3 |
| 3300 | 300.7 | 43.7 | 45.8 | 148.4 | | | | 714 | 17.7 |
| 3400 | 344.4 | 67.5 | 54.1 | 180.7 | | | | 804 | 19.4 |
| 3500 | 411.9 | | 68.2 | 234.7 | 3 | 10 | 91 | 926 | 21.9 |
| 3549 | 506.0 | | | | | | | | |

FT 7.62-A-2
C-1

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
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Chief of Staff.

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NG: None

USAR: None

For explanations of abbreviations used, see AR 320-50.

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